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Panorama Sunroof

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Panorama Sunroof

Model: E83/53/61/91

Production: Start of Production MY 2004

OBJECTIVES

After completion of this module you will be able to:

- Familiarize yourself with the panorama sunroof

E83/53/61 Panorama Glass Sunroof

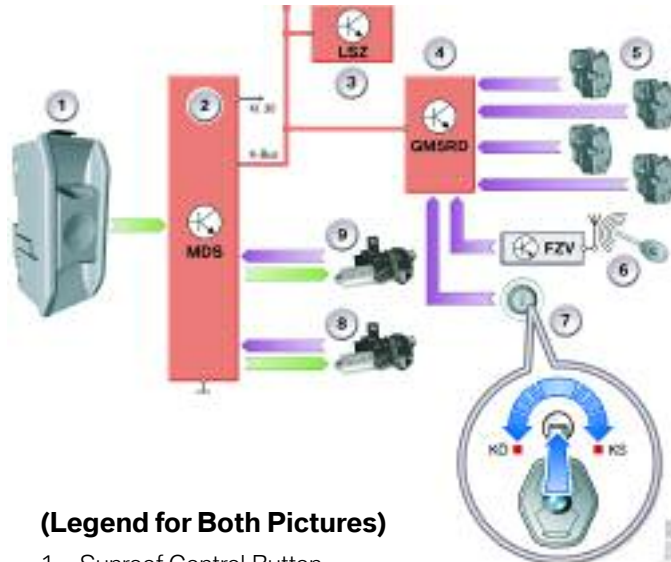
One of the highlights of the X3 is a fully automatic, two-part panorama glass sunroof with an area of almost one square metre. Its front window section can be fully opened while both window sections can also be tilted rearward. The panorama glass sunroof affords an outstanding view for the rear occupants and, when fully opened, lends the vehicle the impression of being almost a Convertible.



E83/53 System Components

The panorama glass sunroof assembly consists of the following components:

- Panorama Glass Sunroof control unit, MDS
- 2 Drive Motors
- 2 Part floating headliner
- 2 Glass covers
- Power Supply
- K-Bus Interface
- Wind deflector



(Legend for Both Pictures)

1. Sunroof Control Button
2. MDS
3. LSZ
4. GM5RD
5. Door Contacts
6. FZV
7. Driver's Door Lock
8. Motor
9. Motor

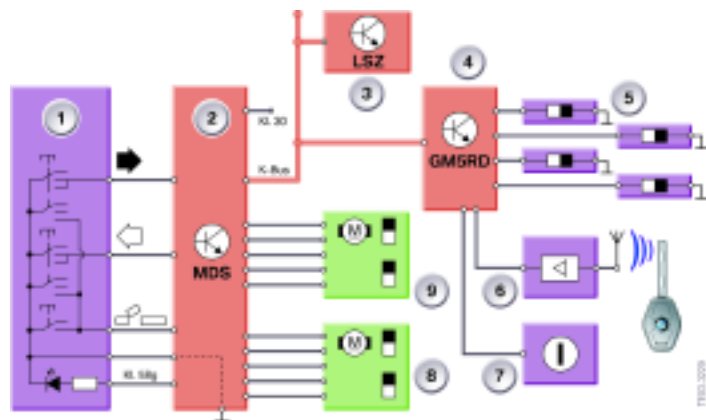
MDS

The MDS is a further development of the slide/tilt sunroof module fitted to the E 65.

The MDS contains the following components:

- Control Electronics
- K-Bus Interface
- Drive motor Relay
- Hall Sensor Power Supply

The drive motors are connected to the MDS by a 10 pin connector. The remaining components are connected via a 16 pin connector.



Drive Motors

The motor is a DC motor. The hall sensors are integrated in the motors to detect motor revolutions. These signals are forwarded to the MDS for analysis.



E61 System Components

The panorama glass sunroof assembly consists of the following components:

- Panorama Glass Sunroof control module, MDS
- 2 Drive Motors
- 2 Part floating headliner
- 2 Glass covers
- Wind deflector

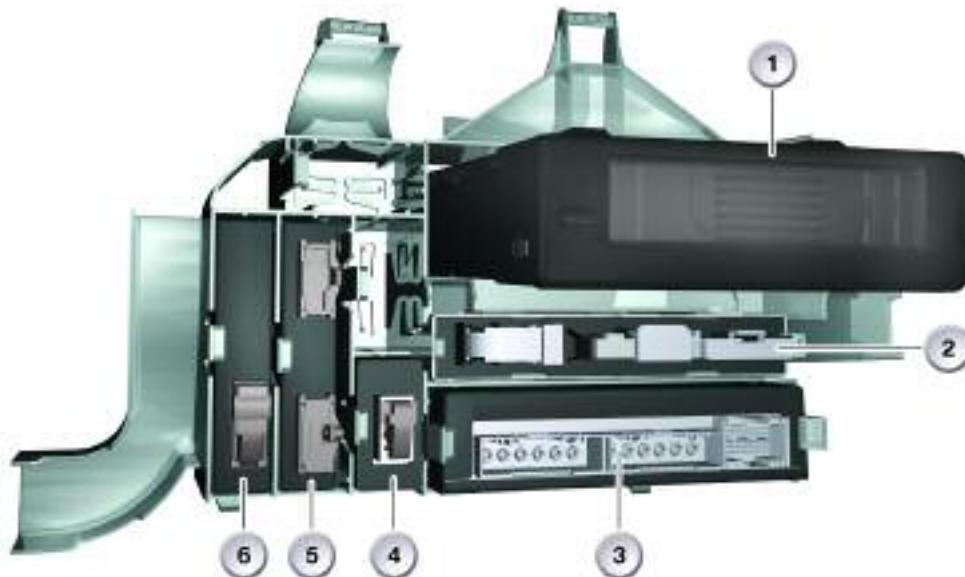
Multi Drive Sunroof Control Module

The MDS contains the following components:

- Control Electronics
- K-CAN Interface
- Drive motor Relay
- Hall Sensor Power Supply

The Multi Drive Sunroof MDS controls and monitors the electric motors and therefore the movement of the panorama glass sunroof.

The MDS is installed on the carrier behind the glove compartment.



Control units in the carrier behind the glove compartment

Index	Explanation	Index	Explanation
1	CD changer CDC	4	Adaptive headlight AHL
2	Basic body module KBM	5	Multi Drive Sunroof MDS
3	Safety and gateway module SGM (up to 9/05)	6	Comfort Access (9/2005)

Floating Headliner

The floating headliner consists of two parts controlled by a Bowden Cable.

The headliner is interlocked to the function of the glass roofs. The headliner must be opened before the glass sunroof will open. On closing the glass sunroof must be closed before the headliner can be closed.

Glass Covers

Two glass covers are installed in the panorama sunroof. Six bolts secure the front glass to the frame and four bolts secure the rear glass.

Power Supply and K-Bus Interface

The MDS acts as the power supply module for both the sunroof motor and the headliner motor. Communication with the rest of the car is through the K-Bus. The MDS receives and transmits K-Bus messages.

Wind Deflector

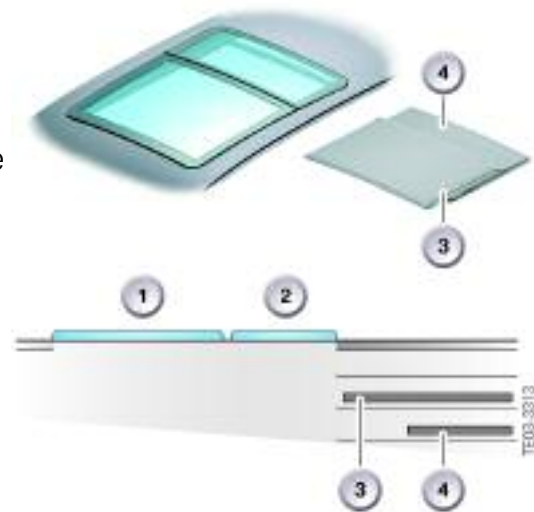
The wind deflector is cable operated by the rear (headliner) motor.

System Operation


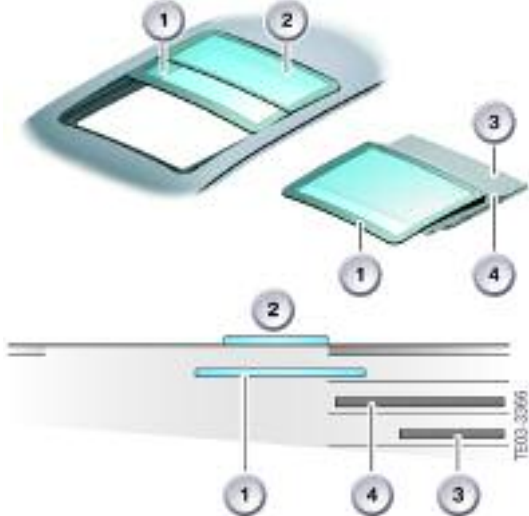

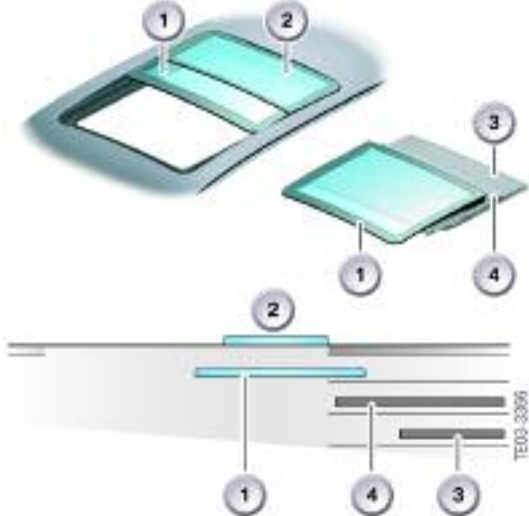

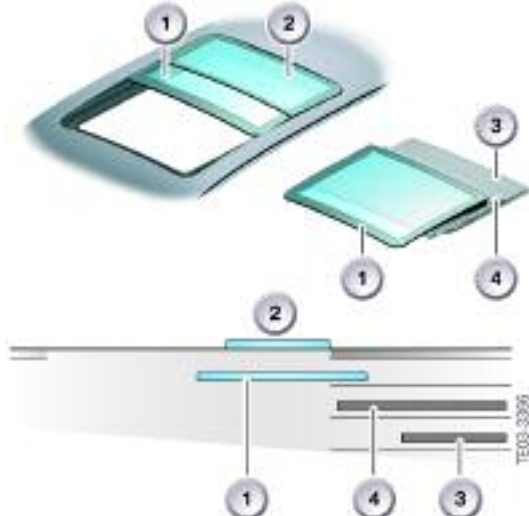
Operation of the panorama sunroof is similar to the conventional slide/tilt sunroof. It functions both as a tilting sunroof and a slide/tilt sunroof. The rear glass only tilts, the front glass slides and tilts. Rear tilt is possible only when the front glass is also tilted. The GM5RD signals the MDS for convenience opening and closing of the panorama glass sunroof.


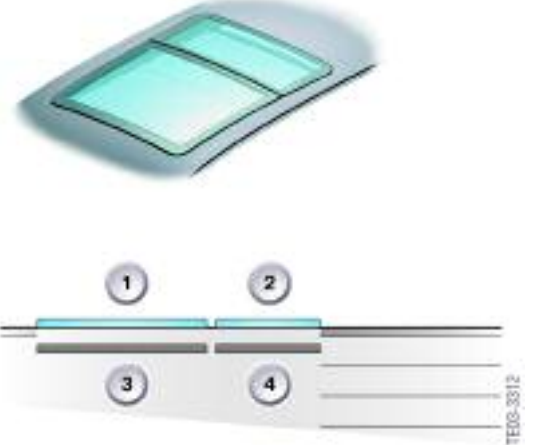

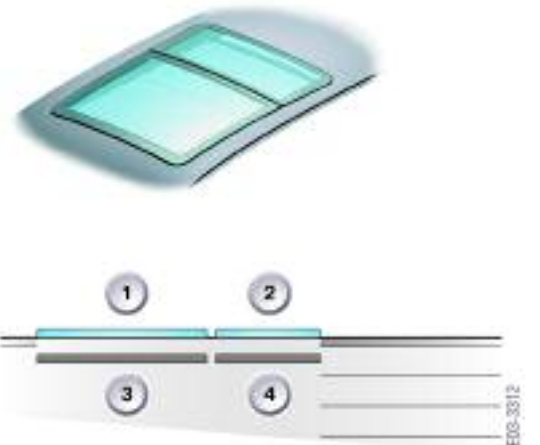

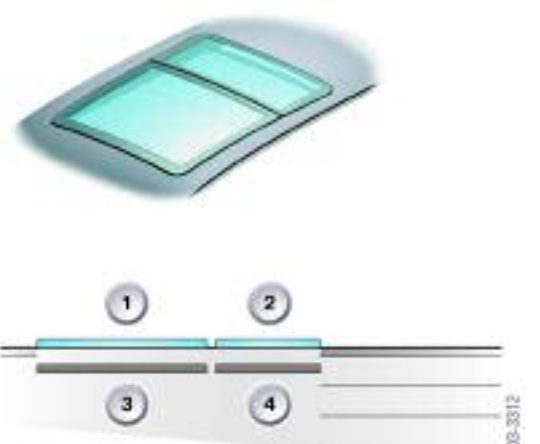
The panorama glass sunroof is operated as follows:


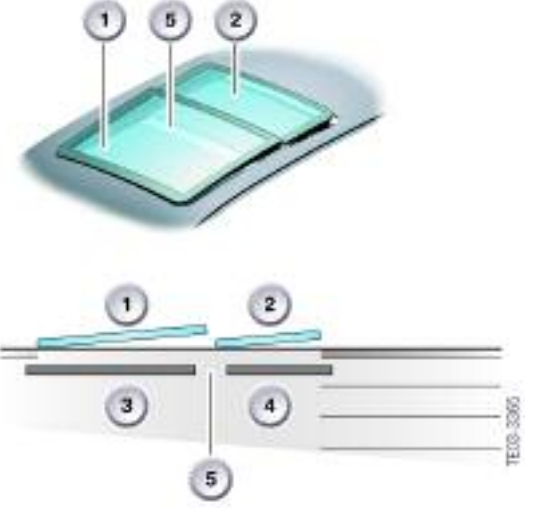

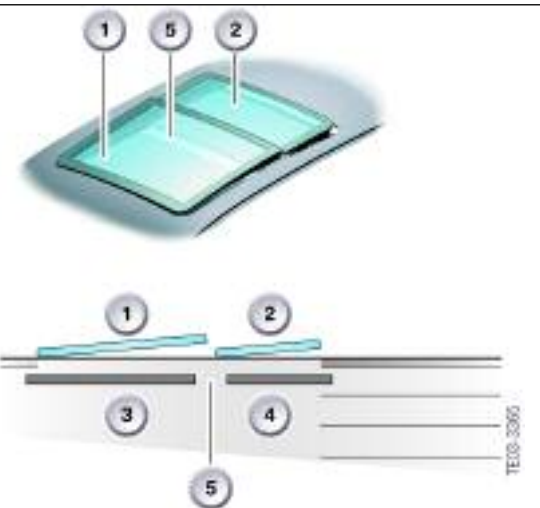

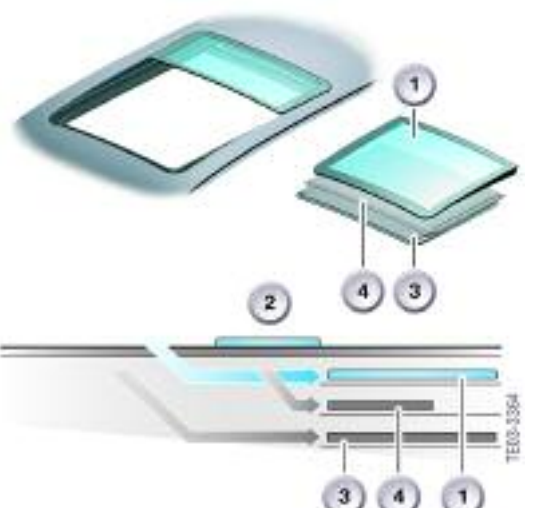
- Headliner and glass sunroof Closed.
- Headliner closed, front and rear glass in tilt position (Headliner goes to vent position).
- Headliner open, sunroof closed.
- Headliner open, sunroof opened manually.
- Headliner open, sunroof opened to comfort position (Via one touch opening).
- Headliner open, sunroof opened fully (Beyond comfort position).



1. Front glass sunroof
2. Rear glass sunroof
3. Front Floating Headliner
4. Rear Floating Headliner

Control Button	Movement	Panorama Glass Sunroof Positions
 <p>Manual opening of panorama glass sunroof by sliding button to first detente position</p>	<p>Floating headliner of glass tilt sunroof and slide/tilt sunroof are opened until the control button is released.</p>	
 <p>Automatic opening of panorama glass sunroof by sliding the button beyond the pressure point to the second detente position</p>	<p>Panorama glass sunroof is automatically opened to the comfort position.</p>	
 <p>Double-click function</p> <p>Automatic opening of panorama glass sunroof by sliding the button twice beyond the pressure point to the second detente position</p>	<p>Panorama glass sunroof is automatically opened to the comfort position.</p>	

Control Button	Movement	Panorama Glass Sunroof Positions
 <p>Manual closing of panorama glass sunroof by sliding control button in first detente position</p>	<p>Floating headliner or glass tilt and slide/tilt sunroofs are closed until the control button is released</p>	
 <p>Automatic closing of panorama glass sunroof by sliding the button beyond the pressure point to the second detente position</p>	<p>Floating headliner or glass tilt sunroof or slide/tilt sunroof are fully closed</p>	
 <p>Double-click function</p> <p>Automatic closing of panorama glass sunroof by sliding the button twice beyond the pressure point to the second detente position</p>	<p>Floating headliner and glass tilt sunroof or slide/tilt sunroof are fully closed</p>	

Control Button	Movement	Panorama Glass Sunroof Positions
 <p>Manual opening of panorama glass sunroof by pressing control button to first detente position</p>	<p>Panorama glass sunroof is opened to raised position until the control button is released</p>	
 <p>Double-click function</p> <p>Automatic opening of panorama glass sunroof by pressing the button beyond the pressure point to the second detente position</p>	<p>Panorama glass sunroof is fully opened to raised position and the floating headliner is moved to the vent position.</p>	
 <p>After opening panorama glass sunroof via one touch, the sunroof may be opened fully (rather than the comfort position) by sliding the control button to the first detente and holding.</p>	<p>Front glass of panorama sunroof will move from comfort position to fully open position.</p>	

Floating Headliner

Opening

On opening the front part of the headliner moves over the rear part of the floating headliner. The special feature of the floating headliner is that it can be opened fully without the sunroof being open or tilted.



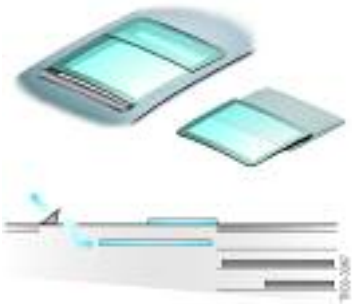
Vent Mode

When the panorama glass sunroof is moved into the tilt position, the floating headliner is moved into the vent position.

The vent position reduces the suction effect at high road speeds.

Wind Deflector

The wind deflector is regulated according to road speed. When the sunroof is opened the wind deflector remains in the down position until road speed is seen by the MDS. Then the wind deflector is placed in the extended position. At roads speeds greater than 140km/h (84mph) it is retracted to an intermediate position. If the road speed drops below 100km/h, the wind deflector is again raised.



Initialization

Initialization must be performed on the panorama glass sunroof anytime the MDS loses positioning of the glass panels or the headliner or if the any component of the sunroof assembly is replaced.

The control button is pressed and held in the position to tilt the sunroof. Initialization begins approximately 15 seconds after pressing the button. The initialization process may take over 2 minutes to perform.

Note: The control button MUST be held in the tilt position during the entire initialization process. Failure to hold the button will result in the initialization procedure to be cancelled.

During initialization the panorama sunroof will operate as follows:

- Both sunroof panels enter tilt position(Headliners enter Vent Mode)
- Both Headliners open
- Both sunroof panels lower
- The front sunroof panel opens then closes
- Both Headliners close

Anti-Trapping Protection

Both the covers and the floating headliners are fitted with anti-trap protection. If the MDS detects something in the path, the appropriate motor is stopped and activated in the reverse direction.

Service Notes

The motors may be replaced individually. An initialization procedure is required after replacing one or both of the motors

The MDS control unit may be replaced separately. The panorama glass sunroof must be recoded and initialized after MDS replacement.

E91 Panorama Sunroof

All E91 Sports Wagons sold in the US will be equipped with a panorama sunroof. The E91 panorama sunroof is an internally operating slide/tilt sunroof with two glass lids and two floating roofliners.

The glass surface area of the E91 sunroof has increased by 140% when compared with the sunroof on the E46 Sports Wagon. This improves the sense of space felt by both the front and the rear passengers.



Panorama Sunroof (E91)



Single Panel Sunroof (E46/3)

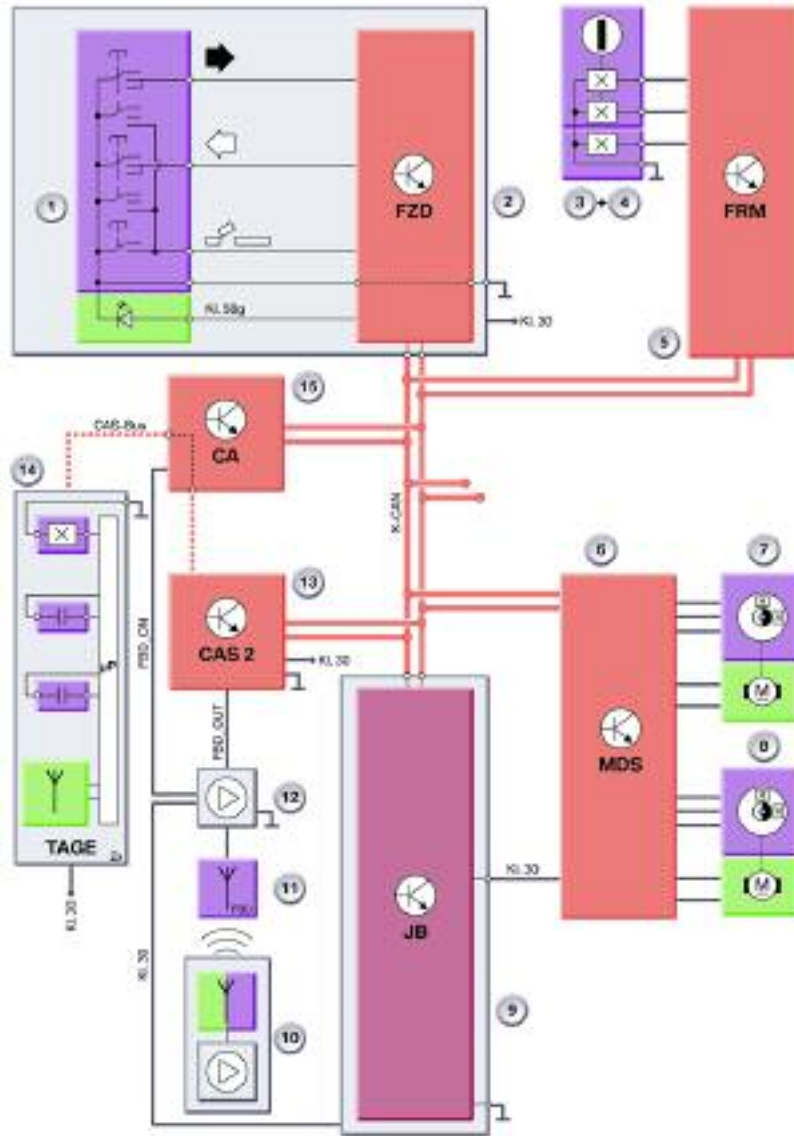
The E91 panorama sunroof is based on that of the E83 with a slight yet significant change. The 50 mm wide ventilation gap on the floating roofliners is at the front and not in the middle as on the E83.

The wind deflector is operated by a mechanism controlled via the floating roofliner motor. This wind deflector is controlled as a function of vehicle speed.

In this way, both lower-frequency drumming (at approx. 70 km/h) and higher-frequency whistling (above 120 km/h) are suppressed.

This is achieved by the net wind deflector, which adopts different heights and therefore counteracts the interference noise.

Panorama Sunroof System Overview



Index	Explanation	Index	Explanation
1	Button for Panorama Glass Sunroof	9	Junction Box Electronics (JBE)
2	Roof Function Center (FZD)	10	Identification Transmitter
3	Lock Cylinder, Driver's Door	11	Rear Window Antenna
4	Door Contact, Driver's Door	12	Remote Control Receiver
5	Footwell Module (FRM)	13	Car Access System 2
6	Multi Drive Sunroof Control Unit (MDS)	14	Electronic Outer Door Handle (TAGE)
7	Motor Panorama Sunroof (glass)	15	Comfort Access
8	Motor Panorama Sunroof (liner/deflector)		

System Components

The panorama sunroof is composed of the following components:

- Glass panels
- Roofliners
- Wind Deflector
- 1 glass panel motor
- 1 headliner/wind deflector motor
- Multi Drive Sunroof (MDS) control unit
- Roof Function Center (FZD) control unit
- Footwell Module (FRM)
- Junction Box (JB)
- Car Access System 2 (CAS2)
- Dynamic Stability Control Unit (DSC)



Individual Components of Panorama Sunroof

Glass Panels / Roofliners

Both glass lids can be removed from the E91 panorama sunroof. The retaining screws must also be released if the lids are adjusted.

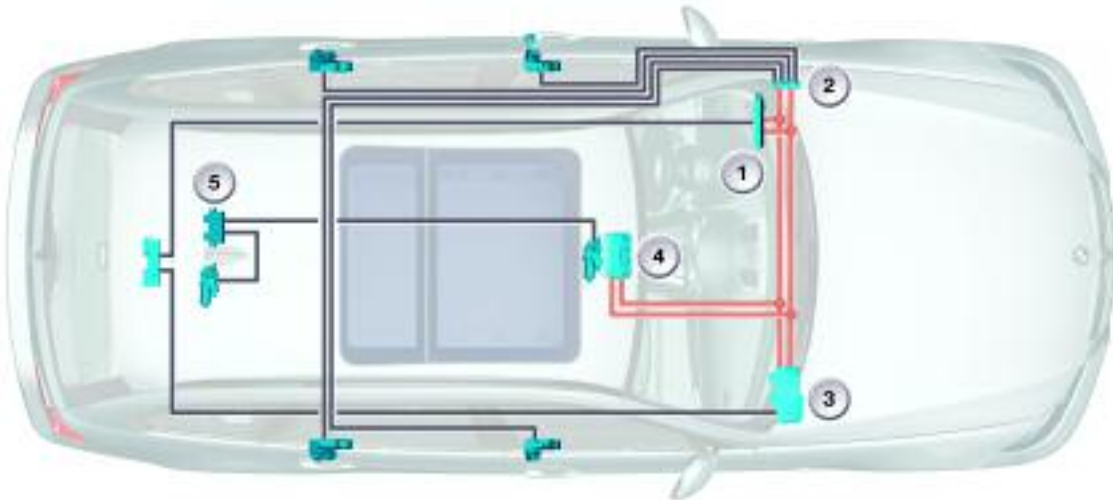
The two floating roofliners can then also be removed. When the panorama sunroof casing is installed, the two electric motors and the wind deflector can still be installed and removed.

Motors

The panorama sunroof uses two motors for operation. One motor is used solely for the operation of the glass panels and the other controls the roofliners and wind deflector.

The motors are identical and thus can be interchanged for diagnostic purposes but should always be left in their original position. This is due to the wear pattern on the motor drive to the bowden/screw cable that drives the sunroof components.

Each motor contains two Hall sensors offset by 90 degrees with respect to each other. This enables the MDS control unit to accurately detect rotation, speed of rotation, and direction of rotation. This signal is also used to detect a possible trapping condition.



Electrical Components of Panorama Sunroof

Index	Explanation
1	Car Access System (CAS2)
2	Footwell Module (FRM)
3	Junction Box Electronics (JBE)
4	Roof Function Center (FZD)
5	Multi Drive Sunroof (MDS)

Multi Drive Sunroof (MDS) Control Unit

A separate control unit is installed for the panorama glass sunroof functions. The panorama glass sunroof control unit (multi drive sunroof MDS) controls and monitors the electric motors and thus the movement of the panorama glass sunroof.

The MDS is installed in the headliner behind the panorama glass sunroof. It can be accessed from the rear of the vehicle.

Roof Function Center (FZD) control unit

The FZD is used to receive the sunroof switch status and convert it to a signal that can be transmitted to the MDS control unit over the K-CAN. The roof function center control unit also houses the sunroof switch.



Index	Explanation
1	Interior lighting under transparent trim
2	Ambient lighting
3	Reading light
4	Ambient lighting
5	Reading light
6	Emergency call
7	Handsfree microphone

Roof Function Center Control Unit (FZD)

Footwell Module (FRM)

The FRM transmits the status of the driver's lock cylinder for convenience open/close features.

Junction Box

The JB supplies the MDS control unit power via a KL30g circuit for panorama sunroof motor operation.

Car Access System 2

The CAS2 enables or disables the operation of the panorama sunroof by sending terminal status signals to the MDS control unit via the K-CAN.

Dynamic Stability Control Unit

The DSC control unit is responsible for making the vehicle speed signal available to the MDS control unit for wind deflector operation.

Principles of Operation

The panorama sunroof operation has been almost entirely adapted from the E61 Sports Wagon and X3/X5.

The only difference in operation is that when the sunroof glass panels are placed in the vent mode, the floating headliner does not vent from the middle. Instead the sunroof headliner slides back from the front section similar to conventional single panel sunroofs.



Ventilation Gap E91

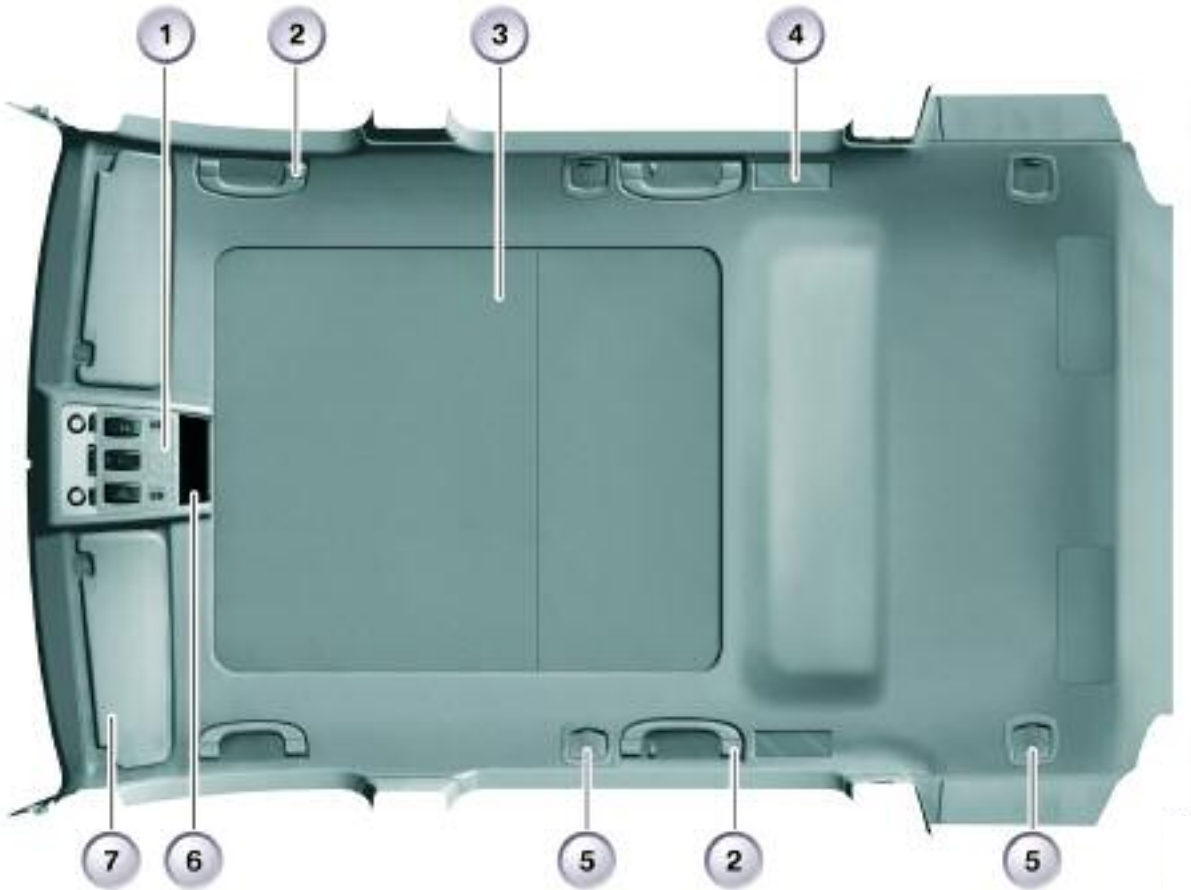


Ventilation Gap E61

Notes

Headliner

The headliner of the E91 is totally new due to the changes in the body and the panorama sunroof.



Index	Explanation
1	Roof Function Center (FZD)
2	Roof Handles, (Rear with Coat Hooks)
3	Panorama Sunroof
4	Interior Lights
5	Attachment Mount (Eyelet) for Combination Roller Blind
6	Ultrasonic Interior Movement Detector
7	Sun Visor with Illuminated Vanity Mirror



Workshop Exercise - Panorama Glass Sunroof

The customer has complained of a stained rear sunroof headliner. The sunroof headliner has been received, and now must be replaced. However when the vehicle arrives in the shop, the headliner will not operate.

1. *Check fault memory and list any faults.* _____

2. *Is there a Test Plan for this situation?* _____
3. *Perform the Test Plan.* _____
4. *Which section of the Test Plan best fits this situation?*

5. *From where does the headliner motor receive its power?*

6. *What is the easiest place to check the power supply to the headliner motor?* _____
Check power for visor motor at MDS. _____
7. *Is B+ available at the headliner motor?* _____
8. *Repair the fault.* _____
9. *List the steps necessary to remove the rear headliner.*

10. *List the movement of the sunroof and headliner during initialization.*

